



Hon. Mike Rann MP  
Premier of South Australia

Senator Steve Hutchins  
Chairman  
Senate Foreign Affairs, Defence and Trade References Committee  
Suite 51.57  
Parliament House  
CANBERRA ACT 2600

Dear Senator Hutchins

The South Australian Government is pleased to contribute to the timely and important Senate Inquiry into the scope and opportunities for naval shipbuilding in Australia.

Our submission has been forwarded to the Secretary as required by the Inquiry's Terms of Reference.

In brief, we believe that the current industry is characterised by:

- a) an overabundance of shipbuilder and repair companies;
- b) an oversupply of dated, uneconomical and uncompetitive infrastructure;
- c) a shortage of a highly skilled workforce;
- d) a lack of coordinated investment in skills development;
- e) volatile Navy demand for shipbuilding and repair services.

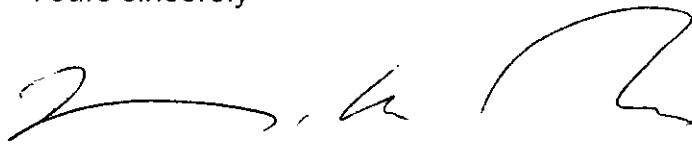
Our report concludes that following the bow wave of Air Warfare Destroyer and Amphibious ship construction work, there will be insufficient ship demand to sustain the industry. We believe that there is an opportunity now for strong leadership at a national level to develop and sustain this critical industry.

The circumstances exist where industry advice can be sought and integrated with Navy's long-term requirements, to provide a solution that sustains a long-term industry. That solution would see the capability being developed around ASC for the Air Warfare Destroyer being further developed to become the single focal point for future national shipbuilding. Competitive tension would be maintained at the shipbuilder level through by open book, performance and incentive based contracts whilst full competition would be maintained for the many suppliers and subcontractors that support the shipbuilder.

Should the opportunity arise for the Committee to take verbal submissions, South Australia would welcome the opportunity to contribute.

I wish the Committee success in the Inquiry on this critical industry.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Mike Rann', with a stylized flourish at the end.

MIKE RANN  
**Premier**

20/2/2006

Attachment::

*A Submission by the South Australian Government to the Senate Committee of Inquiry into Australia's Naval Shipbuilding Capabilities.*

# GOVERNMENT OF SOUTH AUSTRALIA SUBMISSION



## SENATE COMMITTEE INQUIRY AUSTRALIA'S NAVAL SHIPBUILDING CAPABILITIES



**Government of South Australia**

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## **ATTACHMENT**

ACIL Tasman Report into Naval Shipbuilding in Australia February 2006

## TERMS OF REFERENCE

1. On 10th November 2005, the Senate referred to the Senate Foreign Affairs and Trade Committee the task of inquiring into and reporting on the scope and opportunity for naval shipbuilding in Australia and in particular:
  - The capacity of the Australian industrial base to construct large naval vessels over the long term and on a sustainable basis;
  - The comparative economic productivity of the Australian shipbuilding industrial base and associated activity with other shipbuilding nations;
  - The comparative economic costs of maintaining, repairing and refitting large naval vessels throughout their useful lives when constructed in Australia vice overseas;
  - The broader economic development and associated benefits accrued from undertaking the construction of large naval vessels.

# 1 EXECUTIVE SUMMARY

## 1.1 OVERVIEW

- 1.1.1 The physical environment of Australia as an island nation dictates the criticality of having an independent and effective maritime capability to contribute to our national defence and security requirements into the foreseeable future. To deliver this maritime capability, shipbuilding, repair and maintenance must be recognized as a national strategic industry. Maintaining and evolving a shipbuilding and repair capability is critical to sustaining flexible and capable naval forces that can pursue national interests.
- 1.1.2 In Australia at present, the plethora of ship builders and repairers, the absence of modern, price competitive infrastructure, the high cost and availability of skilled workers and the lack of long-term stable ship demand, will challenge the very existence of this strategic industry.
- 1.1.3 Had the strategic security circumstance permitted, it would have been preferable not to build the Air Warfare Destroyer (AWD) and Amphibious ships at the same time. That said, the attached industry analysis indicates that industry can build and deliver both programs should the government wish to do so, albeit at some risk to schedule.
- 1.1.4 There are four primary reasons why both these, and future generations of warships can, and should be built and maintained in Australia. They are:
- a. a very considerable direct economic benefit accrues to the nation;
  - b. the enhanced industry experience and skill gained through these programs is critical to our ability to deliver and keep warships at sea;
  - c. knowledge we gain from dealing with some of the world's most advanced defence technologies flows into Australian industry; and
  - d. there is a strategic benefit in being capable of delivering defence platforms and systems which meet our operational requirement as it gives Australia an important technological edge over those unable to reach this level of sophistication, and hedges against changed geo-strategic security circumstances.

## 1.2 RESPONSE TO THE TERMS OF REFERENCE

- 1.2.1 The South Australian Government has commissioned ACIL Tasman to conduct a detailed analysis of the Australian shipbuilding and repair sector. This analysis was used as a basis to provide the economic data sought by the Senate for their Inquiry in naval shipbuilding and repair.
- 1.2.2 Our findings on the respective terms of reference are:

***First Term of Reference:*** *The capacity of the Australian industrial base to construct large naval vessels over the long term and on a sustainable basis.*

It is beyond doubt that Australia has the industrial base to construct large naval ships. Simultaneous large ship construction is not an ideal plan from a workload perspective, but is manageable. Noting the criticality of this industry to the nation, it is time to develop a national skilling and shipbuilding infrastructure plan.

***Second Term of Reference:*** *The comparative economic productivity of the Australian shipbuilding industrial base and associated activity with other shipbuilding nations.*

We have found there is little definitive information available to assess the economic productivity of constructing naval vessels in Australia compared with overseas. The available data suggests that Australian productivity would be on par with Europe and North America but would be unlikely to match the economy of scale that can be achieved by Japan, Korea or China. Australia will need to consolidate shipbuilding skills and infrastructure if it is to derive economy of scale benefits.

***Third Term of Reference:*** *The comparative economic costs of maintaining, repairing, and refitting large naval vessels throughout their useful lives when constructed in Australia vice overseas.*

We again find that the available data cannot provide a definitive picture of any premiums that might apply to ships constructed and maintained in Australia vice overseas. In the case of Anzac ships, the estimated premium for an Australian build was more than compensated by additional economic benefits. Of the limited research conducted into maintaining and repairing warships, conducting work in Australia has reduced these costs. During the



design phase of the AWD and Amphibious programs, there is ample opportunity to plan to maximise the benefits of conducting repair and maintenance work in country.

***Fourth Term of Reference:*** *The broader economic development and associated benefits accrued from undertaking the construction of large naval vessels.*

Our analysis shows there is no doubt that there are significant economic and other strategic benefits to the nation of building and maintaining large naval vessels in Australia.

### 1.3 RECOMMENDATION

- 1.3.1 We must not underestimate the task ahead in successfully delivering and maintaining ships that meet Australia's naval capability requirements. As the only customer to this market, the Commonwealth must set the parameters by which industry can succeed. A long-term Commonwealth shaped shipbuilding industry plan is essential. Such a plan would recognise that:
- a. demand over the longer-term cannot sustain multiple shipbuilders around the nation;
  - b. infrastructure modernisation and rationalisation is vital if the industry is to deliver cost effective products;
  - c. establishing a hub of shipbuilding construction activity will provide geographical stability allowing both shipbuilders and governments to invest in skills and infrastructure with confidence;
  - d. competition can coexist in a single location whilst leveraging of common infrastructure and a local market for shipbuilding skills;
  - e. a long-term, performance and incentive based shipbuilding contract in which costs are completely transparent to the customer will aid in maintaining innovation and cost competitiveness;
  - f. similar long-term term repair and maintenance contracts should be placed for the Fleet; and
  - g. future ship demand must be planned to sustain the broader industry capability that meet Navy's requirements.

- 1.3.2 Taking into consideration the factors mentioned in 1.3.1 above, this submission recommends that the sale of ASC be used as the catalyst to shape an efficient and sustainable shipbuilding and repair industry in Australia. The capability being developed around ASC to build AWDs should become the single focal point for infrastructure investment and skills development for the future shipbuilding industry.

## 2 INTRODUCTION

- 2.1.1 The South Australian Government is pleased to contribute to the timely and important Senate Inquiry into the scope and opportunities for naval shipbuilding in Australia. With its cornerstone partner, ASC, planning is well underway to transform industrial land at Port Adelaide into the future hub of naval warship construction in Australia. Recognising that modern shipbuilding requires a breadth of technical trade expertise, system integration and graduate and postgraduate engineering and management qualifications, the State is investing in a broad spectrum of skills attraction and development programs that will complement its world class infrastructure and make an important contribution to Australia's security posture.
- 2.1.2 Widespread rationalisation of the international defence industry has occurred over the past two decades as the cost of weapon systems rise, and national defence budgets remain constrained. Even with State and Federal investment in this critical industry, when the bow wave of Air Warfare Destroyer (AWD) and Amphibious ship construction work is complete, remaining long-term demand will not be sufficient to support the existing ship builders.
- 2.1.3 The reasons for rationalisation are straightforward. Those shipyards that take on a module construction role as a sub contractor to the Prime ship builder will almost certainly have insufficient work to enable full utilisation of their existing assets and infrastructure. Full employment of a skilled workforce will be problematic. Those yards that win no work for either of these programs will face serious economic consequences. For any of these companies to win future shipbuilding work it will almost certainly involve regenerating a skilled project management and engineering team, a skilled work force, and significant recapitalisation of their facilities. All of which will be factored into the price Defence will pay, as will the risk for re-done work consequent to the learning needed to become competent at their jobs.
- 2.1.4 The major consideration is whether "market forces" alone can drive a national shipbuilding skills and infrastructure program.
- 2.1.5 Without due consideration now, a rare opportunity to take the long view of this industry will have been lost.

- 2.1.6 This paper addresses the Terms of Reference of the Senate Inquiry with a particular view of:
- a. the strategic and economic importance to Australia of the shipbuilding and repair industry,
  - b. industry performance characteristics from a national and international perspective,
  - c. international industry trends and their implications, and
  - d. proposes, that in this uncertain strategic environment, the Commonwealth take a lead role in ensuring that the naval shipbuilding and repair industry can contribute to our future self-reliant defence posture.

### **3 THE STRATEGIC DEFENCE IMPORTANCE OF NAVAL SHIPBUILDING**

#### **3.1 INTRODUCTION**

- 3.1.1 The size and nature of the Australian continent and its ocean surrounds mean that its military strategy is fundamentally oriented to the maritime environment. We share no land borders with any other country and any military threat to Australia would have to be made through or over our maritime approaches. Conversely, deploying our forces will require heavy lift ships and their effective protection to traverse our nearby archipelagos and oceans to their area of operations.
- 3.1.2 The Defence White Paper 2000 states that our strategic geography, our relatively small population and our comparative advantage in a range of technologies all dictate our advanced defence capabilities should focus on our air and sea requirements. To do this, we especially need to maintain a distinct margin of technological superiority in naval and air capabilities, including the ability to modify, adapt and maintain them for our unique operating environment. Australia is therefore now developing an amphibious force capable of deploying the Hardened and Networked Army to distant operational theatres<sup>1</sup>.
- 3.1.3 Australia's aircraft industry has the ability to assemble and modify foreign designed aircraft such as the Tiger helicopter and Hawk trainer, but the cost of designing and building a future fighter aircraft for the RAAF is beyond our reach. But that is not the case for the naval sector, where a considerable reservoir of knowledge and expertise has been generated from the Collins and Anzac projects as well as its on-going ship repair programs.

#### **3.2 AN ISLAND CONTINENT**

- 3.2.1 A key strategic priority for successive governments has been the capacity to deploy independent naval strength into the ocean and archipelago areas adjacent to the continent.

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<sup>1</sup> Australia will acquire the largest amphibious ships in the Asian region, which (as Defence Update 2005 acknowledges) will need to be protected by potent naval forces.

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- 3.2.2 Defence Update 2005 states that "The first duty of the Australian government is to provide for the security and defence of Australia and Australian interests." Australia has vast maritime interests to protect:
- a. we have one of the longest coastlines in the world (over 20,000 km);
  - b. our territorial seas and exclusive economic zone amount to an area greater than the continent itself;
  - c. we have extremely valuable offshore gas and oil resources in the Northwest Shelf and Bass Strait;
  - d. our fish stocks are vulnerable to illegal poachers, including in distant Antarctic waters;
  - e. our economy is fundamentally dependent on a free flow of shipping, which accounts for 99.9% of our international trade by weight and 73.5% by value;
  - f. Australia is heavily dependent on sea lines of communication that pass through the narrow straits and confined waters of the archipelago to our north to our crucial markets in Northeast Asia, as well as across the Pacific and Indian oceans to our markets in North America and Europe; and
  - g. the geography of mainland Australia, and the proximity of our northern approaches to potential operations, necessitates core naval infrastructure and major fleet support bases be located in the south, close to Australia's industrial centres, augmented by operating bases in the North.

### **3.3 AUSTRALIA'S MARITIME STRATEGY**

- 3.3.1 The physical environment of Australia dictates the criticality of having, as an island nation, an independent and effective maritime capability. When he launched Defence Update 2005, Prime Minister Howard stated that the key principles of the Defence White Paper 2000 remained intact. That document clearly states "The primary priority for the ADF is to maintain the capability to defend Australian territory from any credible attack, without relying on help from the combat forces of any other country." It goes on to say that the key to defending Australia is to control the air and sea approaches to our continent, so as to deny them to hostile ships and aircraft, and provide maximum freedom of action for our own forces. That means we need a fundamentally maritime strategy.

3.3.2 In the submission by the Chief of the Defence Force in 2003 to the Joint Standing Committee on Foreign Affairs, Defence and Trade Inquiry into the Role of Maritime Strategy in Australia's Defence Policy, he stated that "being able to exert strategic control over our maritime approaches is fundamental to Australia's defence and that of our immediate neighbourhood." He also noted that Australian contributions "to operations further a field will also have a strong maritime influence". For example, Australia has had a permanent naval presence in the Middle East ever since the 1991 Gulf War. And our deployment to East Timor in 1999 depended crucially on maritime capabilities for the transport and protection of our troops.

3.3.3 So, Australia's maritime strategy is crucial to:

- a. the defence of Australia,
- b. our capacity to contribute effectively to the security of our immediate neighbourhood, and
- c. the provision of important contributions to allied and regional coalitions in support of our wider strategic interests as required by the government.

3.3.4 To do this, we are developing potent forces to maintain an assured capability to detect and attack any major surface ships, and to impose substantial constraints on hostile submarine operations in our extended maritime approaches. We are developing a greatly enhanced naval capability to support Australian land forces deployed offshore, to protect Australian ports from sea mines, and to support civil law enforcement and coastal surveillance operations.

### **3.4 NAVAL SHIPBUILDING AND REPAIR CAPABILITY**

3.4.1 All significant maritime nations maintain a core naval shipbuilding and repair capability. This applies not only to the major maritime powers but also to medium-size countries, such as Sweden, the Netherlands, Spain, Italy and Canada and, in our own region, South Korea, Singapore, Indonesia, Malaysia and New Zealand.

3.4.2 The ability to provide cost-effective through life maintenance, as well as repairing combat damage, is greatly enhanced when the naval vessels are built in Australia. Our great distances from major North American and European suppliers means that having an indigenous shipbuilding industry greatly enhances our defence self-reliance.

- 3.4.3 As described elsewhere in this submission, the knowledge and skills required to construct a ship of the complexity of the AWD, or a submarine such as the Collins, takes a very long time to acquire. Nations such as those in paragraph 3.4.1 regard their ability to have a freedom of choice in these very important capabilities as critical. They have made conscious decisions, on the grounds of strategic defence reasons to make and continue to make the investment needed to enhance their ability to manufacture and maintain their own warships. Australia's circumstances and maritime destiny would if anything, make having this industrial capability that much more fundamental.



## **4 GENERAL OVERVIEW OF MODERN SHIPBUILDING**

### **4.1 A WELL DEVELOPED CAPABILITY**

- 4.1.1 The naval shipbuilding and repair sector is the only defence sector in Australia that seeks to build and integrate major weapon systems, making significant demands on skills in project management, heavy engineering, electronics and system integration. The sector draws on considerable infrastructure that is regionally concentrated in our populated coastal centres.
- 4.1.2 Modern warships are constructed in modules and partially fitted out at building sites often remote from where they are eventually consolidated. The ability to construct modules concurrently has proved to be the most cost effective way to deliver modern warships. Modular ship production begins with hundreds of smaller subassemblies such as piping sections, ventilation ducting, other shipboard hardware and major machinery items being joined together. These sections are assembled with other shipboard sensors and weapons to form ship modules.
- 4.1.3 Modules, often weighing hundreds of tons, and between 60% to 90% complete, are then moved to the final consolidation site where they are aligned and then welded together on land to form the completed ship hull. Once watertight, a launch can take place, but there remains considerable work to finalise the fitting out of a complex warship to meet its purpose.
- 4.1.4 A floating dock, slipway or shiplift is used to launch the completed hull. In terms of providing ship launch and recovery services, the modern ship lift has proven to be the most effective and cost efficient infrastructure. Following launch, final ship outfitting is completed at the wharf, systems are set to work, and pre-delivery certification and onboard crew training finalised.
- 4.1.5 Our industry base is more than capable of competently building ships based upon overseas designs and adapted to Australian circumstances.
- 4.1.6 Generally we do not have the design or production capability to deliver the small number of key weapon systems and sensors required. Australian industry does, however, have the ability to adapt and integrate systems to meet our environmental requirements, and a number of very smart

companies have emerged from their experience in working in this field and supporting the Navy. These capabilities extend across a very broad spectrum of mechanical and electronics technologies that are progressively increasing the Navy's abilities to choose Australian solutions over those of other countries. Intellectual property is as much a consideration for the Navy as any other major enterprise, and having the ability to modify designs tailored for Australian circumstances is very important. Purchasing warships from other countries, even the US, may not give Australia the full freedom it needs to incorporate these smaller, but critical systems and subsystems.

## **4.2 DEVELOPING AND SUSTAINING A HIGHLY SKILLED WORKFORCE**

- 4.2.1 Government policy states that our self-reliant defence cannot be assured unless the capabilities exist in Australian industry to maintain, modify, upgrade and repair our warships. By inference, building ships is not seen as a critical strategic capability; this is not so.
- 4.2.2 With ship and system complexity increasing, questions arise whether the entire skill set can be maintained without involvement in the building process. This has little to do with the fabrication of steel, rather the overall knowledge and skill developed through project managing the overall building process.
- 4.2.3 There are some very important lessons to be gained from building complex warships such as the Collins program, which include:
  - a. Being reliant upon an overseas company for ship design and production can seriously inhibit future ship modification and ongoing maintenance. There is no guarantee that overseas suppliers will maintain the skill sets that are critical to maintain current systems or deliver ship upgrades that might be conducted decades after a ship is designed.
  - b. In terms of the necessary skills sets, there is no doubt that challenging technical work, well beyond just routine maintenance, is required to retain a technically competent, motivated and productive workforce.
  - c. There needs to be specifically planned programs for the development and sustainment of these skill sets.

- 4.2.4 Australia's small industrial and educational base suggests that nurturing these highly specialized skills cannot be left only to the marketplace. The Defence Materiel Organisation, industry and state government must work together to develop specifically tailored educational and trades programs in this regard.
- 4.2.5 The Commonwealth's "Skilling Australia's Defence Industry" (SADI) initiative is a good start in providing leadership on skilling the workforce. This initiative is more suited for the "Prime" companies that win major contracts but needs to be made more appealing to small to medium enterprises (SMEs) that are the "engine room" of the industry.
- 4.2.6 To fulfil the Government's mandate for a self-reliant maritime industry capability, there is a requirement to develop and sustain a skill set over the broadest possible range of tasks. The RAN and other countries have found that such a skill set is much more likely to be achieved by being involved in the entire build program rather than constraining development to the through life support process. Finally, to further aid in the development and sustainment of this increasingly vital core of shipbuilding and repair skills, it will be important to provide a much higher degree of geographical stability to the workforce than that has been afforded in the past.

## **5 TRENDS IN INTERNATIONAL COMMERCIAL AND WARSHIP CONSTRUCTION AND REPAIR**

### **5.1 THE MARKET**

- 5.1.1 South Korea and Japan currently supply around 65% of the total commercial ship building market. China will emerge in the next decade as a serious low cost competitor. The dwindling share of the commercial market currently produced by European and North American companies will be placed under even greater pressure as China expands its shipbuilding infrastructure and starts to build more complex ships.
- 5.1.2 Growing segmentation of the commercial shipbuilding market is also a factor. It suggests the continuing cost competitiveness of Korea and China in the tanker and bulk carrier end of the construction market (where low labour costs is a significant differentiator) and growing specialisation of industrialised countries (with higher wage rates, skill and technology levels) in high-end shipbuilding.
- 5.1.3 These developments have been delivered despite a significant production over-capacity, of perhaps 20%. One of the principal reasons for this over-capacity has been the indirect support provided by governments who consider shipbuilding to be strategically important. With continued investment by China and Korea in infrastructure, commercial vessel prices will continue to be under pressure.
- 5.1.4 The military market has remained, at best, relatively flat over the past twenty years. The United States maintains the largest military fleet but orders for ships have declined by 60% in the decade following the Cold War. There is an expectation in some circles that worldwide demand will increase, particularly in Asia over the next two decades.

### **5.2 CHALLENGE FOR MILITARY SHIPBUILDERS**

- 5.2.1 The challenge for military shipbuilders is to manage the increasing cost of ship design, development and construction in a fiscally constrained environment.
- 5.2.2 Improved productivity and cost competitiveness for builders is crucial as military customers become more even more demanding. One means of spreading the significant capital and skills investment required of warship

builders is to expand into commercial ship construction. Yet this is extraordinarily difficult to achieve because:

- a. the chronic oversupply of world wide infrastructure provides low returns creating significant barriers for new entrants,
- b. building commercial vessels requires a different and not complimentary skill set than military ships,
- c. the productivity achieved by large scale Asian operations is difficult to match, and
- d. the subsidies and protection provided to some international shipbuilders restricts competitive opportunities.

5.2.3 Faced with tight defence budgets and with little prospect of amortising military ship building costs through increased export or commercial activity, Governments have led the rationalisation process to ensure capability is maintained.

5.2.4 The US now has two primary military shipbuilders remaining across six yards. Consolidation in Europe has not proceeded at a pace similar to other defence industry sectors, but there appears little doubt that the privatisation of 49% of DCN by the French Government will create the stimulus to reduce the 23 yards and 20 naval shipbuilders currently in Europe.

### **5.3 IMPLICATIONS FOR AUSTRALIA**

5.3.1 There has been argument both for and against the need for rationalisation of Australian shipbuilders and infrastructure. What is clear is that underlying world trends of decreasing demand, increasing capital intensive infrastructure and building costs, extensive skills shortages and budget pressure will have some impact. With our very much smaller naval shipbuilding and repair program it would seem naïve to think that worldwide trends would not apply.

5.3.2 The challenge for Government is to show leadership in any rationalisation process without destroying the competitive tension that keeps industry innovative and cost efficient. Conversely, few, if any, maritime nations in the world have left the development and sustainment of this critical industry exclusively to market forces.

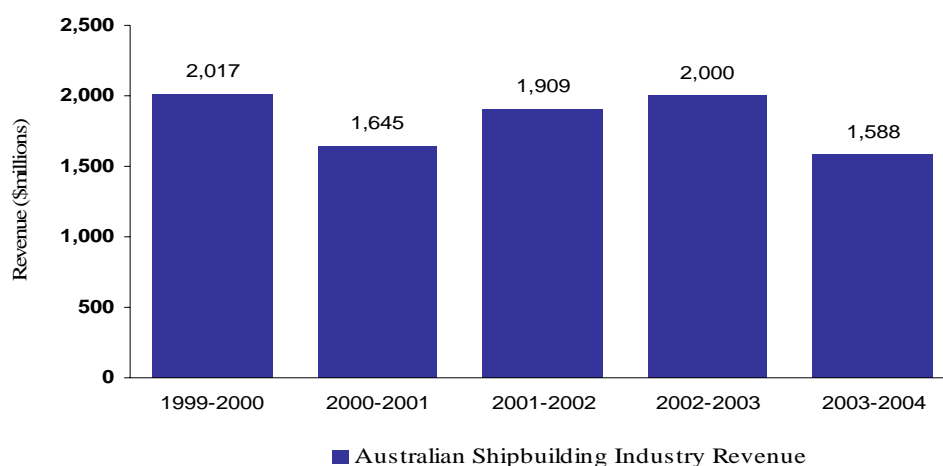
## 6 AUSTRALIAN SHIPBUILDING AND REPAIR INDUSTRY

### 6.1 INTRODUCTION

- 6.1.1 The South Australian Government has commissioned ACIL Tasman to complete an independent review of the Australian shipbuilding and repair industry and to address specifically the Senate Inquiry's terms of reference. The major findings from the attached report are précised in this section of the paper.
- 6.1.2 For the purpose of this paper, the element of shipbuilding and repair market that will be examined in detail will be constrained to ships over 2000 tonnes. In general the skills and infrastructure necessary to build and maintain vessels under this limit are readily available in Australia from a thriving commercial industry, or from smaller military builders.

### 6.2 OVERVIEW OF AUSTRALIAN INDUSTRY

- 6.2.1 Australia's shipbuilding industry, in an international context, is relatively small specialising in the production and assembly of complex naval ships and systems. Figure 1 shows the revenue streams from the Australian shipbuilding sector. Typically 65% of this revenue is generated by defence related shipbuilding, 25% with commercial building and 10% with commercial repair and maintenance.



**Figure 1: Australian Shipbuilding Industry Revenue 1999/00-2003/04<sup>2</sup>**

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<sup>2</sup> IBIS World: Ship building in Australia

- 6.2.2 With the withdrawal of the Government from shipbuilding and repair ownership and operations in the 1980s, Australia's industry expanded to meet an extended period of growth in demand. Over the past twenty years the Collins, Huon, Leeuwin, Anzac and Armidale classes of ships and submarines have been undertaken together with significant modifications to HMA Ships Westralia, Manoora and Kanimbla.
- 6.2.3 This places the RAN in the position where an overwhelming number of its warships and minor war vessels have been constructed in Australia.
- 6.2.4 Six major shipbuilding entities met this demand, namely ASC, Tenix, ADI, Austal, Forgacs and NQEA. The infrastructure supporting these builders and repairers comprises a mixture of generally smaller capacity ship lifts, slipways, docks and floating docks, of variable quality largely positioned on the eastern coast.
- 6.2.5 The common theme in the development of the fleet repair and maintenance infrastructure is the absence of a planned national approach. Docking and repair facilities have evolved on both coasts in response to individual projects. With new major warships requiring less time out of the water, the challenge will be to sustain this infrastructure with the low volumes of use expected. A more detailed description of current Australian shipbuilding and repair infrastructure is contained in the Section 2 of the attached ACIL Tasman report.
- 6.2.6 Numerous companies have similarly evolved on both coasts to offer the necessary repair and maintenance services. With the current emphasis on short-term competition for the award of repair and maintenance work, these companies struggle to achieve the continuity of work that can sustain the skill base. The low margins that arise from short term competition leads to an under investment in long-term skills development and means lessons are relearned, and paid for by Navy, many times. Clearly this leads to potentially substandard products and services being delivered to the Fleet with implications for safety and operational performance.

### **6.3 COLLINS SUBMARINES – AN EXAMPLE**

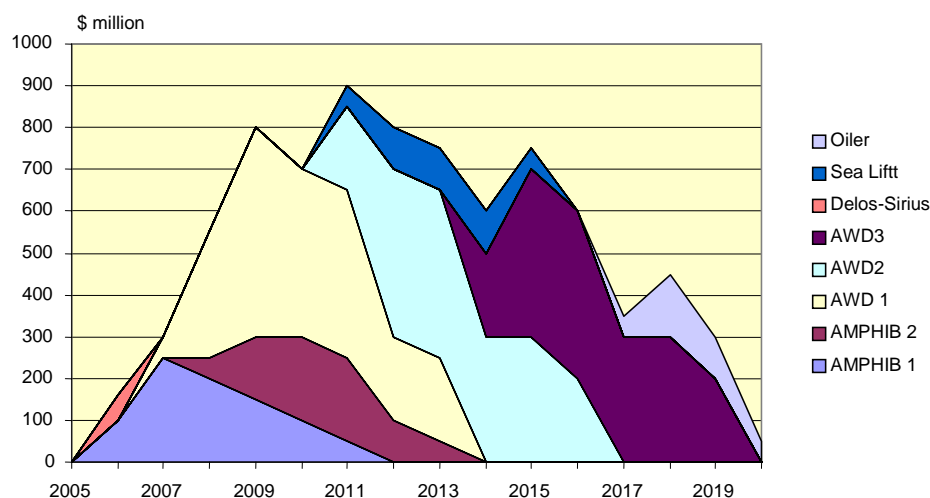
- 6.3.1 By necessity of its dangerous operating environment, its significant cost and its important strategic role, the repair and upgrading of the submarine fleet has been more consciously and systematically addressed than the current generation of warships.

- 6.3.2 The Collins is the most advanced conventional submarine. Built in Australia to a foreign design and modified for Australian requirements, in many respects the AWD will be its surface combatant equivalent. A much-publicised dispute with the parent designer Kockums highlighted issues which arise when intellectual property and contractual arrangements are not effectively controlled nationally.
- 6.3.3 Over several years, the Navy and the DMO, in concert with ASC, evolved the manner of maintaining the Collins submarines, resulting in award to ASC of a contract for through life support valued in the order of \$125m per year for up to 25 years. Major submarine full cycle docking repair activities are conducted at one site in Adelaide with lesser operational repair work completed at the homeport in the West. Submarine maintenance skills have been developed on a national basis.
- 6.3.4 Through nominating it as the through life support agency, ASC (in consultation with its customer and contractual partners) is now able to make the investments in capital equipment, technology and people to deliver the performance needed by the Navy. In many respects this approach represents several hundred man-years of learning how to support ships for which Australia is the “parent”.
- 6.3.5 Such learning is highly relevant to how future warships should be supported through life by their parent shipbuilder and consortia of major mechanical and electronic systems companies. The AWD capital program is publicly costed at \$4.5bn to \$6bn but the total cost to support these ships through their life is likely to be around \$18bn. Early planning during the ship design phase can reduce the AWD through life support costs.

## **6.4 KNOWN SHIPBUILDING AND REPAIR DEMAND**

- 6.4.1 The 2004 Defence Capability Plan (DCP) seeks in total to invest around \$9bn over the next 10 to 15 years in the local shipbuilding industry to purchase AWDs, Amphibious support and underway replenishment ships. Figure 2 shows an estimated profile for future shipbuilding and upgrade workloads.





**Figure 2: Profile of Future Shipbuilding and Repair Industry Activity<sup>3</sup>**

- 6.4.2 The information in Figure 2 is amplified in Table 1, where a forecast annual spend spread is presented numerically. The key feature of this shipbuilding data is that current demand is highly volatile. There is a quick ramp up in activity from 2006 to 2009, followed by reasonably steady demand for 6 to 7 years concluding with a speedy decline to 2020. This very coarse analysis assumes ships will be ordered by the Commonwealth and delivered by industry in accordance with the Defence Capability Plan (DCP). As the occurrence of both events is rare, demand is likely to be even more volatile.
- 6.4.3 Not shown in Figure 2 is the significant funding being invested to upgrade the Collins submarine, FFG and Anzac capabilities through investment in replacing and modernising weapon systems and sensors. Major ship upgrades, if they are to be undertaken in the future, are likely to be conducted at sites that have access to the necessary technical and program management skills that might not necessarily be resident in a ship's homeport.

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<sup>3</sup> Data source: ACIL Tasman

Ship	Amphibious (JP2048)		Air Warfare Destroyer (SEA 4000)			Delos conversion to Sirius (SEA 1654)	HMAS Success replace- ment	Sirius replace- ment	Strategic Sealift Capability	Total
Year	Amph 1	Amph 2	Awd 1	Awd 2	Awd 3					
2006	100					60				160
2007	250		50							300
2008	200		300							500
2009	150	150	500							800
2010	100	200	400							700
2011	50	200	400	200			50			900
2012		100	200	400			100			800
2013		50	200	400			100			750
2014				300	200		100			600
2015				300	400		50		50	800
2016				200	400				50	650
2017					300			50	100	450
2018					300			150		450
2019					200			100		300
2020								50		50
Total	850	700	2050	1800	1800	60	400	350	200	8210

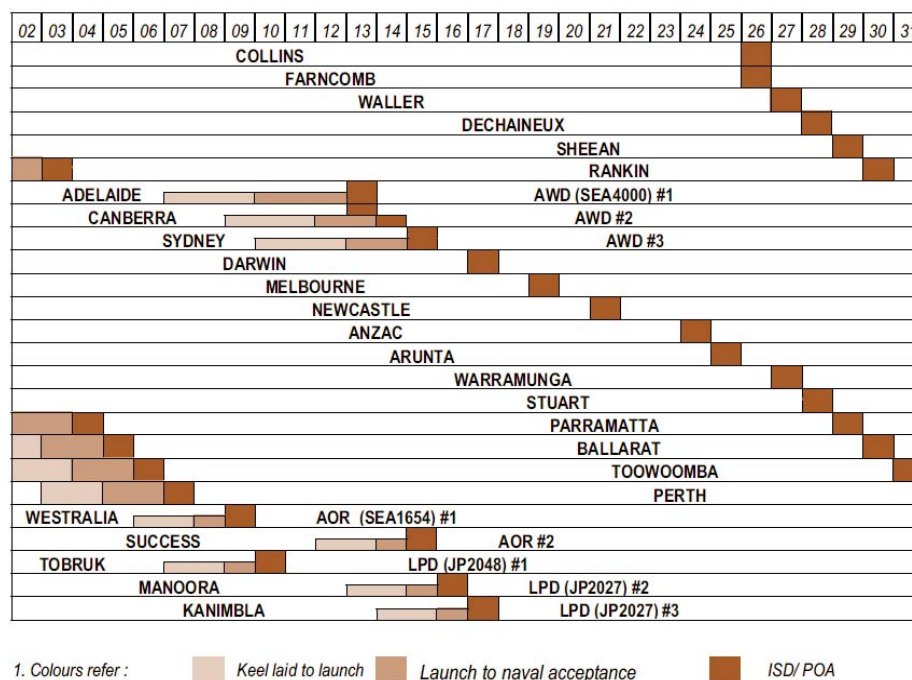
**Table 1: Construction Cost Profile for DMO Ship Projects 2006-2020 (\$2005m) <sup>4</sup>**

6.4.4 Navy expends more than \$500m annually for routine fleet maintenance, repair and inventory purchases.

## 6.5 FORECAST SHIPBUILDING AND REPAIR DEMAND

6.5.1 Beyond the year 2020 timescale, but not yet incorporated into current defence planning cycle, there will be a need to replace the capabilities currently provided by FFGs, the Anzac ships and the Collins class submarines when they retire in the second and third decades of this century. Figure 3 provides broad timeframes for the retirement of the current Fleet.

<sup>4</sup> Source: Department of Defence (2004), Defence Capability Plan 2004-2014 and ACIL Tasman estimates



**Figure 3: Long Term Forecast Future of Naval Shipbuilding<sup>5</sup>**

- 6.5.2 It would not be unreasonable to give some careful thought now to how the Commonwealth funds expended and experience gained by industry and Defence could be leveraged on those yet to be established programs. It ought to be possible to conduct cost of ownership studies which provide insights as to what point the Navy is faced with diminishing returns in its maintenance investment strategies.
- 6.5.3 Navy faces a significant future challenge with repairing and maintaining a fleet based upon both European and US designs. As two additional classes of ships (AWDs and Amphibious ships) are built, unless it is possible to introduce significant elements of commonality of equipment, the challenge and cost of fleet maintenance will rise further. The most effective time to review through life support policies is during the ship design period for the new two classes. Hence, there is a significant challenge ahead for Navy to look at the future Fleet disposition and adopt maintenance and sparing policies and practices that reduce through life support costs.

<sup>5</sup> Naval Ship Repair Sector Plan, Department of Defence 2002 – some dates have changed with Defence Updates

## 6.6 CAPACITY OF AUSTRALIA'S INDUSTRIAL BASE

- 6.6.1 Overall the most challenging time for the industry in the next decade will be the simultaneous build of the AWD and Amphibious classes of ship.
- 6.6.2 A review of skills availability undertaken by ACIL Tasman for the Australian Shipbuilding Advisory Group concluded that the additional level of demand that this shipbuilding program will generate for relevant skill sets is small compared with the total number of skilled workforce available. Figure 4 shows the profile of skills required. As might be expected, the peak period for trade and professional skills requirements corresponds with the major dual build programs. A survey of the shipbuilding industry on potential skill pressures also largely correlates with the skills requirements outlined in Figure 4.

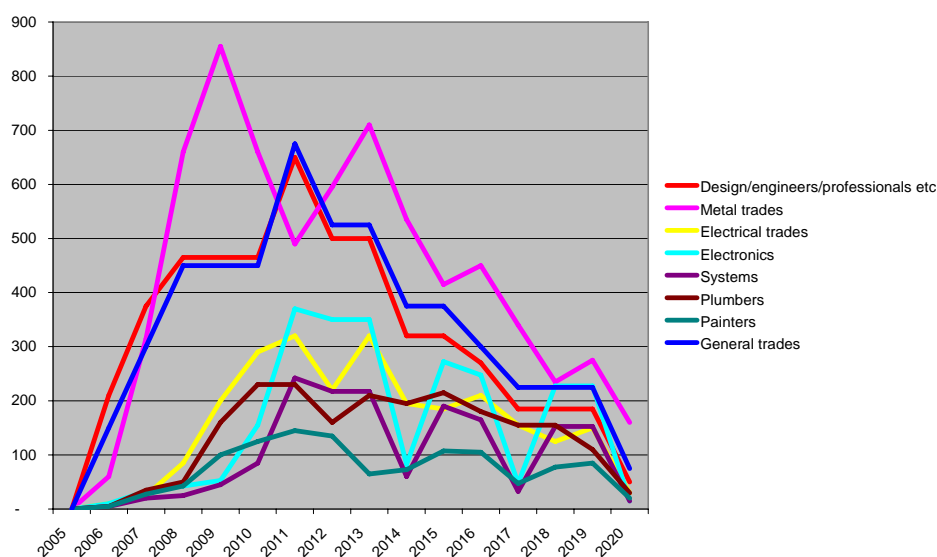


Figure 4: Profile of Trade Skill Demand during Current Australian Programs<sup>6</sup>

- 6.6.3 The physical infrastructure for larger vessels might be divided in two categories. Firstly, warships up to AWD size (potentially 8000 to 9000 tonnes). Infrastructure for these ships will be met by a combination of upgraded ASC and newly built and owned South Australian infrastructure. Secondly, for larger ships around the 20,000+ tonnes Amphibious ship size,

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<sup>6</sup> Source: Skill shortages and the amphibious ships project, Report prepared for the Australian Shipbuilding Advisory Group, ACIL Tasman 2004

additional infrastructure investment is likely. Noting the small number of ships to be built in this category, and their very limited use after program completion, it will be vital to consider long-term sustainability before making further infrastructure investments.

- 6.6.4 In addressing the **first** term of reference for the *Inquiry*, it would seem beyond doubt that Australia has the industrial base to construct large naval ships. Simultaneous large ship construction is not an ideal plan from a workload perspective. It will require wide ranging skill and education initiatives from both industry and governments. Over the long term demand must be smoothed, and shipbuilding infrastructure and skills development consolidated to ensure that the industry is sustainable and efficient. To achieve these challenging policy goals a national shipbuilding and repair plan is required.

## 6.7 COMPARATIVE ECONOMIC PRODUCTIVITY

- 6.7.1 An industry's productivity can be assessed from a number of perspectives that include: labour, capital, multi-factor (ratio of industry output to input) and total factor productivity (ratio of industry output to direct and intermediate inputs). See Section 3 of attached ACIL Tasman report for a detailed explanation. Further complicating the assessment of international or cross business productivity analysis is the very different nature of shipbuilding, from relatively simple "empty tank" vessels that carry oil and bulk commodities to complex naval ships. Warship building generally only accounts for around 25% of the total cost of a ship, yet has a fundamental impact on how wisely the remaining 75% can be expended.
- 6.7.2 Consequently, well-directed expenditure in the acquisition phase of a program may very well generate significantly smaller through life total cost. Suffice to say that the benchmarking of Australian versus international shipbuilding performance needs to be treated with some caution.
- 6.7.3 Perhaps the simplest productivity measure is tonnage per employee; Australia ranks 18th in OECD countries by this measure. Yet as previously mentioned it would be misleading to compare the construction of bulk carriers and container vessels with complex warships. With the available data, value-added per hour worked is perhaps a better comparison of labour productivity. This measure suggests that (excluding Japan and South Korea) Australia's value added per employee is close to the average of most shipbuilding nations.

6.7.4 Value-added as a percentage of turnover provides an indication of the extent of value adding as a proportion of final ship value. The other contribution represents the cost of components, materials and services brought into production by the shipbuilder. Between 1997 and 2000, Australia increased this measure from 40% to 47% and now ranks behind only the USA.

6.7.5 In terms of the *Inquiry's* **second** term of reference, there is little definitive data available to assess accurately the economic productivity of constructing naval vessels in Australia compared with overseas. A report prepared for the Marine Industry Action Agenda concluded that Australian productivity would be on par with Europe and North America but would be unlikely to match the economy of scale that can be achieved by Japan, Korea or China.

## 6.8 COMPARATIVE ECONOMIC COSTS

6.8.1 Again there is little information available to assess any cost premium that might arise for constructing, maintaining and repairing naval vessels in Australia compared with sourcing overseas.

6.8.2 An estimate of possible cost premium for construction in Australia was examined in the Tasman report into the economic impact of the Anzac ship project<sup>7</sup>. The report notes that the issue is complex. Life cycle costing for example could lead to different conclusions for comparison of construction costs and there have been few publicly released comparisons. However, in an attempt to model the impact on the economy of construction work overseas, the Anzac ships case study undertook general equilibrium modelling.

6.8.3 The modelling considered the impacts on the economy in situations where labour markets are flexible (the long run closure) and less flexible (the short run closure). Under the "long run closure" any unemployment associated with the loss of demand for a local Anzac ships industry was addressed immediately via changes in prices, including real wage rates. Under the "short run closure" nominal wage rates in the model were fixed and unemployment adjusted to reflect changes in demand for labour.

6.8.4 Reflecting the above alternative assumptions about labour markets the modelling produced the following upper and lower bounds estimates of the benefit of sourcing the vessels from an Australian supplier rather than an overseas supplier:

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<sup>7</sup> Impact of Major Defence Projects: a case study, Tasman Asia Pacific, February 2000.

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- a. Gross Domestic Product, on average, over the construction period was between \$200 million and \$500 million (1998-99 dollars) higher per annum;
  - b. consumption (an indicator of a community's material well-being) over the construction period, was between \$147 million and \$300 million (1998-99 dollars) higher per annum; and
  - c. increased employment per annum, was in the order of 7,850 jobs.
- 6.8.5 The Department of Defence estimated that the possible domestic cost premium for the Anzac ship project was around 3.5%. This estimate seems to support shipbuilder's anecdotal evidence that cost premiums for national shipbuilding ranges from +5% to -5%. <sup>8</sup>
- 6.8.6 As nations repair and maintain their Fleets in very different manners even if data was available it would be difficult to compare. Yet noting that the vast majority of ship costs accrue during operation, a clear focus on maintenance and repair is essential. Intuitively, encouraging the use of Australian maintainers and repairers utilising local piece parts where possible, would seem to be the most cost effective option. Procurement lead-time will be shorter requiring a lesser investment in inventory. Strategically, ready access to both skills and spare parts is vital for a nation in our geographic location.
- 6.8.7 Tasman Economics conducted a study of the benefits/costs to Defence of conducting in service support in Australia for the Minehunter Project in January 02. The report concluded that the benefits of the Minehunter arrangements were<sup>9</sup> :
- a. cost saving for Defence in money and resources for in service support;
  - b. shorter turn around times than out of country support, particularly in times of international crisis;
  - c. under the Minehunter through life support contract turn around times were required to be in the range of 90 to 180 days. Defence advised that turn around times for similar work sourced and services from overseas suppliers could be a year or longer;
  - d. increased effectiveness during operations with a 24 hour technical enquiry service;

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<sup>8</sup> See Section 3.3 of attached ACIL Tasman report

<sup>9</sup> See Section 4.2.2 of attached ACIL Tasman report

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- e. opportunities for value adding such as the multi functional system team approach used by ADI and Thales Underwater Systems to support the Minehunter Coastal Vessels;
- development of related and supporting industries that create alliances between systems suppliers and contractors which improve local capability to deliver repair and maintenance services; and
- ability to provide more consistent employment for specialist skills in systems, systems integration and applications.

6.8.8 In terms of the **third** term of reference for the *Inquiry*, again the data cannot provide a definitive picture of any premiums that might apply to the construction and maintenance of large naval ships. However, if the alternative to construction in Australia is another western nation, the statistics suggest that labour productivity may not be markedly different although this is only a partial measure of productivity and cost. Furthermore, it seems clear that in the case of the Anzac ships, the estimated premium for an Australian build was more than compensated by the additional economic benefits. In terms of repair and maintenance, the limited data available again suggests there are significant economic benefits of developing in country support practices. Looking to the future, a purposeful AWD and Amphibious ship design approach that seeks as much equipment and system commonality as possible will drive down maintenance and repair costs. Such an approach will lead international practice.

## 6.9 ECONOMIC BENEFITS

6.9.1 The shipbuilding industry's direct and indirect contribution to the economy in terms of its value of output (revenue), contribution to Gross Domestic Product (industry gross product or value added) and employment are very important. Case studies undertaken for the Anzac ships (Tasman Economics 2000) and the Minehunter Coastal Vessels (Tasman Economics 2002) highlight the benefits to the economy of major defence shipbuilding projects. Input-output multipliers are a well-established analytical approach to assessing the extent of the direct and indirect linkages between an activity (shipbuilding) and the rest of the economy.



- 6.9.2 These multipliers when applied to the total value (\$1,000 million in 2001 dollars) of the Minehunter Coastal Vessel project indicate that in net present value terms the project over its nine year life would<sup>10</sup>:
- a. contribute up to \$1,665 million (2001 dollars) to national output;
  - b. contribute up to \$505 million (2001 dollars) to Australia's Gross Domestic Product; and
  - c. generate (or sustain) up to 9,250 full-time equivalent jobs (Tasman Economics 2002).
- 6.9.3 Multiplier estimates calculated for the Anzac ship project, which involved expenditures of \$5,600 million (\$1998-99 dollars) over a period of approximately 15 years indicated that over this period the project could have<sup>11</sup>:
- a. generated up to \$10,900 million in national output; and
  - b. supported up to 57,000 full-time equivalent jobs (Tasman Economics 2000).
- 6.9.4 Two independently conducted case studies undertaken into the impact of major Defence projects for the Australian Industry Group's Defence Industry Council, highlight that naval shipbuilding can have considerable benefits for the participating Australian businesses and the economy as a whole (see Tasman Economics 2000 and Tasman Economics 2002). In respect of participating businesses these benefits included:
- a. technology transfers that boost business opportunities and performance;
  - b. take up of performance enhancing practices, for example total quality management, quality assurance, just-in-time management and process engineering; and
  - c. higher productivity, for example the average productivity improvement for industry involved in the Minehunter program was estimated at 2.24<sup>12</sup>% .
- 6.9.5 There are numerous examples from the Collins submarine, ANZAC frigates and Huon Minehunters of the knowledge we gain from dealing with some

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<sup>10</sup> See Section 5.1 of attached ACIL Tasman report

<sup>11</sup> *ibid*

<sup>12</sup> See Section 5.2.3 of attached ACIL Tasman report

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of the world's most advanced defence technologies flowing into Australian industry for a wider national benefit.

- 6.9.6 In addressing the **final Inquiry** term of reference, there can be no doubt that there are significant economic and other benefits to the nation of building and maintaining large naval vessels in Australia. To maximise these benefits a long-term planning base must be developed. In a small and modest sense South Australia has created its own plan to stimulate the local industry to deliver the Australian Defence Force's future platform and equipment needs.

## **7 SOUTH AUSTRALIAN NAVAL PLAN**

### **7.1 OUR PLANS**

- 7.1.1 The South Australian Government has developed four plans covering the Naval, Land, Air and Electronic sectors to drive a coordinated approach to grow defence business.
- 7.1.2 The Naval Plan aims to establish the State as the future hub for naval warship construction in Australia. The Plan builds upon the established presence of ASC at Port Adelaide to provide the critical mass of naval shipbuilding infrastructure and a skilled work force that can deliver the next generation of warships.
- 7.1.3 The Plan recognises and embraces the requirement that ship modules will be fabricated around the nation and proposes that future ships be consolidated at a purpose built, state of the art facility at Port Adelaide.

### **7.2 OUR INVESTMENT**

- 7.2.1 Over \$120m will be invested in developing ship building infrastructure. This infrastructure will comprise a 10 000 ton ship lift, wharf and transfer system and will be capable of expansion to meet Navy's largest ship requirement. Initially targeted to support ASC in building the Air Warfare Destroyer, the shipbuilding infrastructure will be available for other naval and commercial programs.
- 7.2.2 Adjacent to this shipbuilding infrastructure, the State will eventually make available more than 100 hectares at Port Adelaide as a high technology defence industrial hub, TECHPORT AUSTRALIA. The initial focus will be to develop the 30 hectares adjacent to the ASC site for submarine and surface ship subcontractors and suppliers to deliver to the established shipbuilding and repair contracts.
- 7.2.3 Recognising the challenge of building the next and future generations of warships requires more than physical infrastructure, the State will also invest in trade and high technology workforce skills development programs that complement its state of the art shipbuilding infrastructure. \$20 m will be invested in a Maritime Skills Centre on site at Port Adelaide to deliver trade and technical training to ASC and other users.
- 7.2.4 With its capability partners DSTO and University of South Australia, more than \$8 m has been committed to address the system integration and

engineering skills through the establishment of the Centre of Excellence in Defence Industry Systems Capability (CEDISC). CEDISC's charter will be to enhance Australian industry capability in software engineering, systems engineering, systems integration and systems maturity.

### **7.3 OUR FUTURE**

- 7.3.1 This extensive program of physical and intellectual infrastructure investment will help to establish the defence industry in the State as a trusted and capable supplier to the Australian Defence Forces.

## **8 AN OPPORTUNITY FOR AUSTRALIA**

### **8.1 TIME FOR BIG THINKING**

- 8.1.1 As an island nation, Australia faces a significant challenge in the coming decades to retain the breadth and flexibility of naval forces necessary to pursue national interests. Maintaining an Australian shipbuilding and repair capability is a critical element in providing the government with options to deliver defence and foreign policy objectives in this uncertain strategic environment.
- 8.1.2 Our analysis of the current industry shows that it is characterised by:
- a. an overabundance of shipbuilder and repair companies;
  - b. an oversupply of dated, uneconomical and uncompetitive infrastructure;
  - c. a shortage of a highly skilled workforce;
  - d. a lack of coordinated investment in skills development; and
  - e. volatile Navy demand for shipbuilding and repair services.
- 8.1.3 The reasons for this state of affairs are many, but the most significant contribution can be seen to rest on a lack of strategic direction at the national level for the industry. This is the task of government; industry alone cannot set the ground rules for how it must operate.
- 8.1.4 Albeit with a time gap, the current shipbuilding programs of the AWD and Amphibious ships follow on from the Collins program and closing stages of the Anzac construction program. Both those latter programs are excellent examples of our engineering and endeavour; Australians are as good at building warships as anyone else.
- 8.1.5 The fact is that after completion of the AWD and the Amphibious ship building program, there is clear potential to see ASC decline, in the same way as Williamstown and other building yards have, through lack of future work.
- 8.1.6 While warship and weapon system designs will evolve, it would be an accurate prediction to say that future naval shipbuilding work will come through the replacement capabilities provided by the Anzac frigates and Collins submarines.

- 8.1.7 But, on current government policy approaches, competition for those future programs could be again sought among shipbuilders. Potentially a price will be paid for the start up costs of a new yard and recapitalisation of existing shipbuilders will possibly be needed if there is no a gap in workload. Attrition of the shipbuilder's workforce will be inevitable without continuity of challenging work, and the effort now being made to skill a workforce with consequent national benefits will be dissipated, and be paid for again.

## **8.2 WHAT CAN BE DONE**

- 8.2.1 The foregoing analysis suggests there are significant economic benefits that accrue from conducting shipbuilding and repair in Australia. Noting the strategic reasons which make this industry critical to the nation, there is an urgent need for the Commonwealth to address the challenges that prevent industry from cost effectively delivering the ADF's requirements.
- 8.2.2 The **first** challenge relates to smoothing naval shipbuilding workloads to provide a sustainable level of future business. The prospective workload in the immediate term is manageable, but will generate the largest workload for Australian shipbuilders since the late 1980s. Over the longer-term there needs to be clarification of potential future workload with regard to follow-on capabilities to replace the Collins class submarines and eventual replacements for the Anzac and possibly FFG frigates. A strategic approach to naval shipbuilding in Australia demands that there be reasonable prospects for long-term naval construction business. There is a similar strategic approach required for the ship repair and maintenance sector. Short-term gains that may arise from price competition are more than lost when the lack of continuity of work prevents companies' skilling the workforce to move up the learning curve.
- 8.2.3 A **second** challenge concerns investment in sustainable, modern, competitive infrastructure. Australian shipbuilding infrastructure has evolved on a project-by-project basis rather than in response to a national plan. The myriads of facilities that are left are old, underutilised and not cost competitive. Further infrastructure investment beyond that already planned, can only add to the underutilisation of costly assets.
- 8.2.4 The **third** challenge concerns the development and short-term expansion of an industry skill base. There is a need to develop, in a planned way, local skills to maintain critical capabilities. This relates not only for construction and fabrication skills but also to specialised systems integration and software development competencies. Modern warships have complex electronic,

software and combat systems that determine the lethality of their weapons and we must be able to support and enhance them in Australia whenever it is economically sound to do so. We have the ability to create that environment.

8.2.5 A **final** challenge is to maintain competitive tension in any post-rationalised industry. Competition among the shipbuilders has been the principal Commonwealth tool to attain value for money for shipbuilder programs. Based upon current planning ship demand beyond 2018 will not sustain multiple shipbuilders around the nation. Problems will arise well before then when, if the future remains uncertain, the skilled workforce will move on. The question remains how to drive a sustainable industry base. A single customer/supplier relationship may not drive industry to find cutting edge technologies and work practices.

8.2.6 Whilst there might be many variations, two basic options require more detailed analysis. Firstly, a policy of full and open competition might be retained. This would require Government support and funding to sustain multiple shipbuilders at multiple sites during periods of low demand. Such a policy just works in the US where two large shipbuilders compete to build less than 10 ships per year. The significant economic costs and inefficiencies should this policy be continued was outlined in Section 8.1 of this report. A second option might be based around maintaining the benefits of competition without the cost of sustaining multiple shipbuilders at multiple locations. For example, an open book, performance and incentive based shipbuilding contract could ensure the shipbuilder remains innovative and cost conscious. As a shipbuilder generally sub contracts 40-50% of their work, sufficient competitive tension would be maintained for suppliers to the shipbuilder. If there was felt to be a need to maintain two shipbuilders, this should be achieved at a single site where maximum use could be made of common infrastructure and skills base.

### **8.3 STRONG LEADERSHIP**

8.3.1 This submission has canvassed as wide a range of issues as it can reasonably do to address the terms of reference set by the Senate Committee. Considerations by the Committee are timely and important to address how best to shape an industry that primarily services a single client, the Australian government, and through it, the Royal Australian Navy.

8.3.2 There is an opportunity now for strong leadership at a national level on this critical industry. The circumstances exist where industry advice can be sought and integrated with Navy's long-term requirements, and strategic

solutions derived. The capability now being developed at ASC can be taken further, and by designing a business model and incorporating it in the method of sale, Adelaide should be 'the' location where all of Australia's warships and submarines are constructed.

- 8.3.3 This submission therefore proposes that the sale of ASC be designed with these strategic intentions in the forefront of thinking for those charged with that responsibility to create an efficient and sustainable warship and submarine building and repair industry in Australia.